

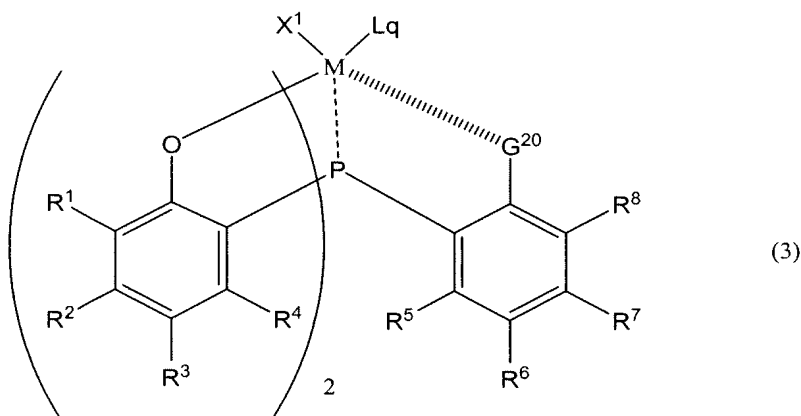
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 39. (Cancelled)

40. (Currently Amended) A production method of a transition metal complex of formula (3):

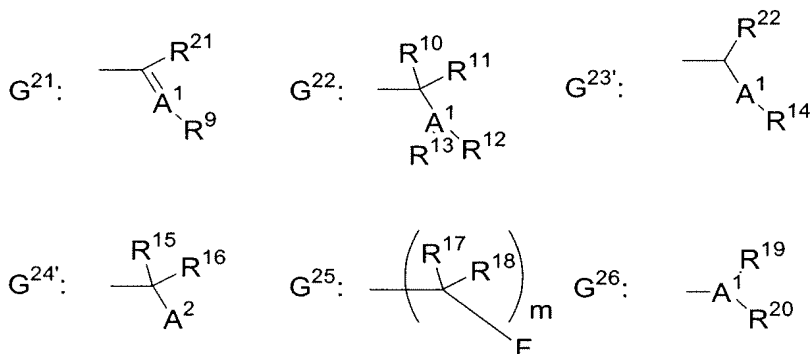


wherein M represents an element of Group 4 of the periodic table,

R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , X^1 and L are as defined below,

q represents an integer of 0 or 1,

G^{20} represents any one of G^{21} to G^{26} ,



wherein A^1 represents an element of Group 15 of the periodic table,

provided that A^1 in $G^{23'}$ represents an anion of an element of Group 15 of the periodic table and A^1 in G^{21} represents a nitrogen atom,

A^2 represents an element of Group 16 of the periodic table,

R^9 and R^{14} each represents,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

a group of formula:

$R^{90}-N-R^{91}$;

wherein R^{90} and R^{91} are the same or different, and represent

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to ~~20~~ 40 carbon atoms,
a substituted or unsubstituted aryl group having 6 to ~~20~~ 40 carbon atoms, or
a ~~ring~~ **cyclic** structure by being linked together;

R^{12} , R^{13} , R^{19} and R^{20} each independently represents

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

R^{12} and R^{13} , and R^{19} and R^{20} , **each independently, are linked together and**

represent cyclic structure ~~each independently represents a ring structure by being linked together;~~

R^{10} , R^{11} , R^{15} , ~~and~~ R^{16} , R^{21} and R^{22} each independently represents

a hydrogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

R^{17} and R^{18} are **the same or** different ~~one another~~, and represent

a hydrogen atom,

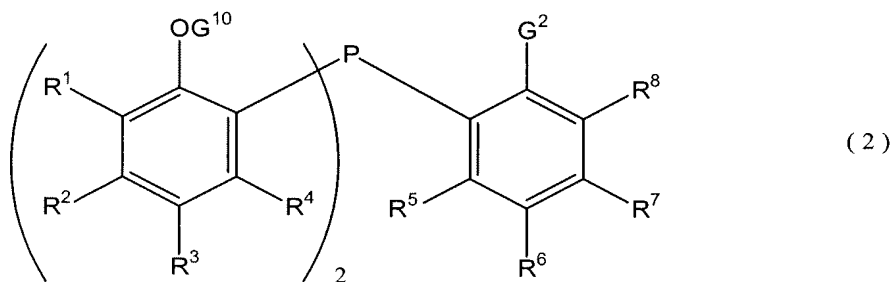
a halogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

m represents an integer of 0 or 1, and

the line linking M and G^{20} represents that M is linked or coordinated to an element of Group 15 or 16 of the periodic table or to a fluorine atom constituting G^{20} ,
which comprises reacting

a phosphine compound of formula (2):



wherein R¹, R², R³, R⁴, R⁶, R⁷ and R⁸ are the same or different, and independently represent,

a hydrogen atom,

a halogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

a silyl group substituted with a substituted or unsubstituted hydrocarbon having 1 to 20 carbon atom(s),

a substituted or unsubstituted alkoxy group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyloxy group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryloxy group having 6 to 20 carbon atoms, or

an amino group disubstituted with hydrocarbons having 1 to 20 carbon atom(s);

R⁵ represents,

a hydrogen atom,

a fluorine atom,

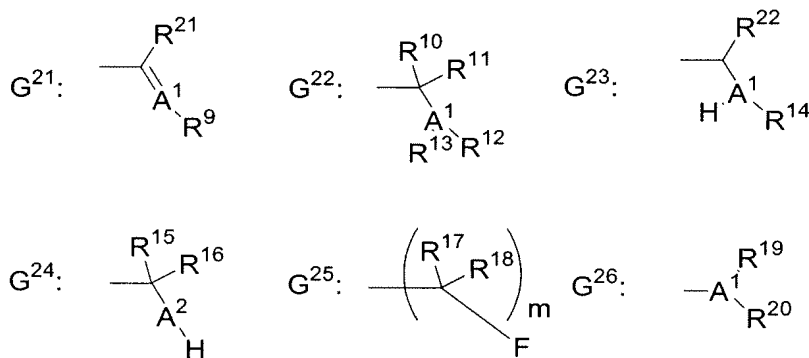
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

a silyl group substituted with a substituted or unsubstituted hydrocarbon having 1 to 20 carbon atoms,

G² represents any one of G²¹ to G²⁶ below,



wherein A¹ represents an element of Group 15 of the periodic table, and A² represents an element of Group 16 of the periodic table, and A¹ in G²¹ represents a nitrogen atom;

R⁹ and R¹⁴ each represents
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or
a group of formula:

R⁹⁰-N-R⁹¹

wherein R⁹⁰ and R⁹¹ are the same or different, and represent
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or
a cyclic structure by being linked together,

R¹², R¹³, R¹⁹ and R²⁰ each independently represents,
a substituted or unsubstituted alkyl group 1 to 10,
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; or
R¹² and R¹³, and R¹⁹ and R²⁰, each independently, are linked together and represent cyclic structure,

R¹⁰, R¹¹, R¹⁵, R¹⁶, R²¹ and R²² each independently represents
a hydrogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

R¹⁷ and R¹⁸ are the same or different, and represent

a hydrogen atom,

a halogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

m represents an integer of 0 or 1,

wherein ~~R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸ and G²~~ are as defined in Claim 1, and G¹⁰ represents a protective group of the hydroxyl group selected from alkyl groups having secondary or tertiary carbon atom linked to ~~an~~ **the** oxygen atom of phenol, or a C1 to C2 alkyl groups substituted with a substituted or unsubstituted alkoxy group, with a transition metal compound of formula (4):



wherein M represents an element of Group 4 of the periodic table,

X¹ represents,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

a substituted or unsubstituted alkoxy group having 1 to 10 carbon atom(s),

a substituted or unsubstituted araloxy group having 7 to 10 carbon atoms,

a substituted or unsubstituted aryloxy group having 6 to 10 carbon atoms, or

an amino group disubstituted with hydrocarbons having 1 to 20 carbon atoms; and

L represents a balancing counter ion or neutral ligand, being an atom or group similar to X¹, and is bonding or coordinating to metal M,

L¹ represents a neutral ligand, and p represents an integer of 0 to 2.

41. (Original) The method according to Claim 40, a base is used.

42. (Original) The method according to Claim 41, wherein G^{10} is a hydrogen atom.

43. (Currently Amended) A production method of the transition metal compound of formula (3) according to Claim 40, wherein G^{10} is a protective group of the hydroxyl group selected from alkyl groups having secondary or tertiary carbon atom linked to ~~an~~ the oxygen atom of phenol, or a C1 to C2 alkyl group substituted with a substituted or unsubstituted alkoxy group.

44. (Original) The production method according to Claim 43, wherein G^{10} is a methoxymethyl group, an ethoxyethyl group, a methoxyethoxymethyl group, trimethylsilylethoxymethyl group or 1-ethoxyethyl group.

45. (Previously Presented) The production method according to Claim 40, wherein M is a titanium atom or a zirconium atom.

46. (Original) The production method of the transition metal complex according to Claim 45, wherein A^1 represents a nitrogen atom and A^2 represented an oxygen atom.

47. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{21} .

48. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{22} .

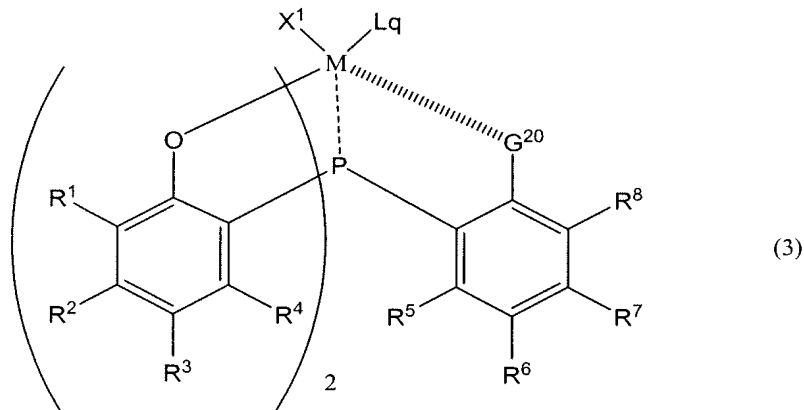
49. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{23} .

50. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{24} .

51. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{25} .

52. (Original) The production method of the transition metal complex according to Claim 46, wherein G^2 is G^{26} .

53. (Original) The transition metal complex of formula (3):



wherein M, L, X¹, R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸, q and G²⁰ are as defined in Claim 40.

54. (Original) The transition metal complex according to Claim 53, wherein A¹ represent a nitrogen atom and A² represents an oxygen atom.

55. (Original) The transition metal complex according to Claim 54, wherein M is a titanium atom or a zirconium atom.

56. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²¹.

57. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²².

58. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²³.

59. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²⁴.

60. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²⁵.

61. (Previously Presented) The transition metal complex according to Claim 54, wherein G² is G²⁶.

62. (Currently Amended) An olefin polymerization catalyst comprising a combination of transition metal complex according to Claim 53, compound A below, and optionally compound B:

compound A: any one of compounds A1 to A3, or a mixture of at least two of them,

compound A1: an organic aluminum compound of formula $(E1)_aAl(Z)_{3-a}$,

compound A2: a cyclic aluminoxane having a structure of formula $[-Al(E2)-O-]_b$, and

compound A3: a linear aluminoxane of formula $E3[-AlE3-O-]_cAlE3_2$,

wherein E1 to E3 are the same or different and each represents a hydrocarbon group having 1 to 8 carbon atom(s),

Z is the same or different, and represents a hydrogen atom or a halogen atom,

a represents 1, 2 or 3,

b represents an integer of 2 or more, and

c represents an integer of 1 or more;

compound B: any one of compounds B1 to B3, or a mixture of at least two of them,

compound B1: a boron compound of formula $BQ^1Q^2Q^3$,

compound B2: a boron compound of formula $Z^+(BQ^1Q^2Q^3Q^4)^-$, and

compound B3: a boron compound of formula $(L-H)^+(BQ^1Q^2Q^3Q^4)^-$,

wherein B is a boron atom of a trivalent state, and

Q^1 to Q^4 are the same or different and represent a halogen atom, a hydrocarbon group having 1 to 20 carbon atom(s), a halogenated hydrocarbon group having 1 to 20 carbon atom(s), a silyl group substituted with the hydrocarbon groups having 1 to 20 carbon atom(s), or an amino group disubstituted with the hydrocarbon groups having 1 to 20 carbon atom(s), and " Z^+ represents an inorganic or organic cation, and (L-H) represents Brønsted acid".

63. (Original) A production method of an olefin polymer, which comprises polymerizing an olefin in the presence of the olefin polymerization catalyst according to Claim 62.